

What is Claimed is:

1. A fluid flow meter conditioning body, for placement in-line of a fluid conveying conduit comprising

an elongated inlet flow section,

5 an elongated flow measurement section for containing a velocity sensor, and

a flow nozzle intermediate said inlet flow section and said flow measurement section for flattening the velocity profile of the fluid, wherein

said inlet flow section, said flow nozzle and said flow measurement section are arranged along a longitudinal axis,

10 said inlet flow section, said flow nozzle and said flow measurement section communicate for fluid flow in a direction from the inlet flow section toward the flow measurement section, and

a cross section of said inlet flow section, perpendicular to said central longitudinal axis, is greater than a comparable cross section of said flow measurement section.

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2. The fluid flow meter conditioning body of claim 1, further comprising one of

an elongated inlet flow diffuser upstream of said inlet flow section,

20 an elongated outlet flow diffuser downstream of said flow measurement section, and

an elongated inlet flow diffuser upstream of said inlet flow section and an elongated outlet flow diffuser downstream of said flow measurement section, wherein

each said diffuser is arranged along said longitudinal axis and communicates with the inlet flow section, the flow nozzle, and the flow measurement section for fluid flow therethrough.

5 3. The fluid flow meter conditioning body of claim 1, wherein said nozzle has a beta of between about 0.3 and 0.7.

4. The fluid flow meter conditioning body of claim 2, wherein said nozzle has a beta of between about 0.3 and 0.7.

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5. The fluid flow meter conditioning body of claim 3, wherein said flow nozzle has a transition between the inlet and the outlet having a profile, in a plane containing said central longitudinal axis, which is arc shaped, elliptically shaped, or bell-shaped.

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6. The fluid flow meter conditioning body of claim 4, wherein said flow nozzle has a transition between the inlet and the outlet having a profile, in a plane containing said central longitudinal axis, which is arc shaped, an elliptically shaped, or bell-shaped.

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7. The fluid flow meter conditioning body of claim 2, wherein each inlet diffuser is of a length to obtain a half-angle expansion of about 6-9 degrees, and has a uniform transition between its inlet and outlet, and

each outlet diffuser is of a length to obtain a half-angle expansion of about 6-9 degrees, and has a uniform transition between its inlet and outlet.

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8. The fluid flow meter conditioning body of claim 1, wherein
said flow measurement section includes a sensor assembly for supporting said
velocity sensor.

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9. The fluid flow meter conditioning body of claim 8, wherein
said sensor assembly supports said velocity sensor to be centered on a central
longitudinal axis of said flow measurement section at a point along the length of the
flow measurement section which is a distance of about 1.5 - 3.5 times the diameter of
the flow measurement section.

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10. The fluid flow meter conditioning body of Claim 1, wherein
a central longitudinal axis of an inlet of said nozzle is displaced from a central
longitudinal axis of an outlet of said nozzle, so as to form an eccentric nozzle.

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11. The fluid flow meter conditioning body of Claim 2, wherein
a central longitudinal axis of an inlet of said nozzle is displaced from a central
longitudinal axis of an outlet of said nozzle, so as to form an eccentric nozzle, and
a central longitudinal axis of an inlet of each diffuser is displaced from a
central longitudinal axis of an outlet of each diffuser, so as to form an eccentric
diffuser

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12. A flow measurement system, comprising
a fluid flow meter conditioning body, for placement in-line of a fluid
conveying conduit comprising

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an elongated inlet flow section,
an elongated flow measurement section for containing a velocity sensor,
a flow nozzle intermediate said inlet flow section and said flow measurement section,
5 a velocity sensor within said flow measurement section, and
a velocity sensor electronic circuit, wherein
said inlet flow section, said flow nozzle and said flow measurement section
are arranged along a longitudinal axis,
said inlet flow section, said flow nozzle and said flow measurement section
10 communicate for fluid flow in a direction from the inlet flow section toward the flow
measurement section, and
a cross section of said inert flow section, perpendicular to said central
longitudinal axis, is greater than a comparable cross section of said flow measurement
section.

15 13. The flow measurement system of claim 12, further comprising one of
an elongated inlet flow diffuser upstream of said inlet flow section,
an elongated outlet flow diffuser downstream of said flow measurement
section, and
20 an inlet flow diffuser upstream of said inlet flow section and an elongated
outlet flow diffuser downstream of said flow measurement section, wherein
each said diffuser is arranged along said longitudinal axis and communicates
with the inlet flow section, the flow nozzle, and the flow measurement section for
fluid flow therethrough.

14. The flow measurement system of claim 12, wherein said velocity sensor is a thermal convection mass flow sensor and the electronic circuit is a constant power anemometer type or a constant temperature anemometer type.

5 15. The flow measurement system of claim 13, wherein said velocity sensor is a thermal convection mass flow sensor and electronic circuit is a constant power anemometer type or a constant temperature anemometer type.

10 16. In a method for measuring fluid flow in an apparatus, the improvement comprising the step of conditioning the fluid flowing through the apparatus so that the fluid has a substantially flattened fluid velocity profile at the point of measurement.

15 17. The improvement of claim 16, wherein the apparatus comprises a fluid flow meter conditioning body.

 18. The improvement of claim 17, wherein the fluid flow meter conditioning body has an inlet section connected to an adjacent conduit, further comprising the step of matching the inside diameter of the conduit to the inside diameter of the inlet section.

20 19. The improvement of claim 17, wherein the fluid flow meter conditioning body is connected to an adjacent conduit, and wherein the fluid flow meter conditioning body has a flow measurement section, further comprising the step of matching the inside diameter of the conduit to the diameter of the flow measurement section.

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